Docket No.: 20523 US (C038435/0120240)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Chyi-Cheng CHEN and Bruno LEUENBERGER

Serial No.: 09/726,880

Filed: November 30, 2000

For: **A VITAMIN POWDER COMPOSITION AND METHOD OF MAKING**

Examiner: L. Channavajjala

Art Unit: 1615

DECLARATION OF DR. CHYI-CHENG CHEN UNDER 37 C.F.R. §1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Chyi-Cheng Chen, a citizen of the United States and resident of Switzerland, hereby declare as follows:

1. I studied at National Chung-Hsing University in Taiwan and was awarded a BS degree in Forest Science in 1968.

2. I continued my studies at Texas A&M University where I was awarded a Ph.D. in Wood Chemistry in 1979. I conduced my post-doctoral work in carbohydrate chemistry at Purdue University from 1981-83.

3. In 1983, I joined Biospherics Inc. in Rockville, Maryland as a Research Associate conducting research to develop and scale-up production of a synthetic non-caloric

sweetener. In 1985, I joined Kraft Inc. in Glenview, Illinois as a Senior Research Scientist conducting basic research in carbohydrate chemistry.

4. In 1989, I joined Roche Vitamins Inc. (now DSM Nutritional Products Ltd.) in Nutley, New Jersey as a Scientific Specialist concerned with developing vitamin, carotenoid, and nutraceutical products with improved stability, bioavailability, and handling properties. I am currently a Senior Scientist and a lab head with DSM in Basel, Switzerland. In this capacity, I conduct research and development concerning vitamin and nutraceutical formulations. I am a co-inventor of 9 patents and a co-author of 10 scientific publications and book chapters.

5. I am a co-inventor of the invention described and claimed in the above-captioned application.

6. The present application discloses and claims powder compositions containing at least one fat-soluble vitamin dispersed in a matrix consisting of an emulsion-forming composition selected from the group consisting of a natural polysaccharide gum, a mixture of polysaccharide gums, a protein, a mixture of proteins, and mixtures thereof, wherein the fat-soluble vitamin is present in the powder composition in the form of solid droplets having an average diameter of about 80 to about 120 nanometers (nm).

7. I am aware that a Final Office Action issued the above-identified application on February 23, 2004. I understand that claims 1 and 7-15 were rejected under 35 USC § 103 over Tritsch *et al.*, EP 0 841 010 ("Tritsch '010") or Tritsch '010 in view of Ford *et al.*, 5,607,707 ("Ford"). (Paper No. 02122004 at 4.) I further understand that claim 17 was rejected under 35 USC § 103 over Stein *et al.*, EP 0 937 412 ("Stein") alone or

Tritsch '010 alone or in combination with Ford in view of Finnan *et al.*, U.S. Patent No. 4,830,859 ("Finnan"). (Paper No. 02122004 at 5.) In the rejections, the Examiner relied on Tritsch *et al.*, U.S. Patent No. 6,071,963 ("Tritsch") as an English translation of Tritsch '010. (Paper No. 02122004 at 4.) Accordingly, the remainder of this declaration discusses the United States Tritsch document.

8. I have reviewed Tritsch, which discloses "stable cold water-dispersible pulverous preparations of microbially produced oil, referred to hereinafter as SCO (Single Cell Oil), which is rich in Arachidonic Acid" ("AA") and a method of making these compositions. (Col. 1, lines 4-8.) Tritsch discloses emulsification of the SCO with an aqueous phase containing fish gelatine dissolved in water. (Col. 1, line 61 - col. 2, line 15.) The emulsion is then dried to produce a dry powder. (Col. 2, lines 27-34.)

9. More particularly, Tritsch discloses that the aqueous solution (matrix) is produced by dissolution of fish gelatine and additional adjuvants in water. (Col. 1, line 66 - col. 2, line 2.) The SCO and matrix are then emulsified:

> the SCO stabilized by an antioxidant is emulsified in this matrix, advantageously by homogenization at atmospheric pressure or elevated pressure up to 1000 bar (100 MPa), preferably at 300-500 bar (30-50 MPa), or also using ultrasonics or similar technology. The pressure and the temperature are not critical parameters in this procedure, which can be carried out readily at temperatures of about room temperature to about 70°C, especially between about 60°C and 70°C, and atmospheric pressure.

10. To demonstrate that the presently claimed compositions would not have been obvious over Tritsch, a study was performed under my supervision and direction. Specifically, Example 2 of Tritsch was replicated. This experiment, set forth below,

demonstrates that the Tritsch process could not produce emulsions with particle sizes as small as those claimed. Moreover, this decreased particle size would not have been expected or predicted by one of ordinary skill in this art at the time the present application was filed.

APPARATUS, MATERIALS, AND PROCEDURE

11. 44.2 g of dried fish gelatine, 44.2 g of crystalline sugar, and 8.6 g of sodium ascorbate were placed in a 600 ml glass container. 80 ml of deionized water were added and the mixture was brought into solution at 50°C while stirring with a mincer disc (1000 r/min). 60 g of SCO containing 40% AA[1] was emulsified into this matrix and stirred for 45 minutes at a speed of 4800. A small sample (about 1g) was taken at the end of 15, 30, and 45 minutes of mixing. The particle size of the internal phase of the emulsion samples were measured using a Coulter Particle Size Analyzer (Model: N4 Plus). The particle size of each emulsion sample is reported in Table 1 (below).

12. The same experiment was conducted at a mixing speed of 6000 rpm. The particle size of each emulsion sample is reported in Table 1 (below).

Mixing Time (min)	Particle Size (nm)	
	Mixing Speed	
	4800 rpm	6000 rpm
15	282	247
30	272	263
45	254	259

Table 1. Particle Size.

[1] Tritsch employed an SCO with an AA content of 50% that is no longer available. Accordingly, an available SCO with 40% AA content was employed. In my opinion, this difference would not affect the size of the particles produced.

13. The change in particle size with increased mixing speed varied from an increase of 1.97 % to a decrease of 12.4%. (*See* Table 2, below.)

Mixing Time (min)	Change in Particle Size (%)
15	-12.4
30	-3.31
45	1.97

Table 2. Percent change in particle size with increase of mixing speed from 4800 to 6000 rpm.

14. The change in particle size with increased mixing time varied from an increase of 6.48% to a decrease of 9.93%. (*See* Table 3, below.)

Time Range (min)	Change in Particle Size (%)	
	Mixing Speed	
	4800 rpm	6000 rpm
15 - 30	-3.55	6.48
30 - 45	-6.62	-1.52
15 - 45	-9.93	4.86

Table 3. Percent change in particle size with change in mixing time.

CONCLUSION

14. In the Tritsch method, increased mixing time and/or speed does not lead to a significant reduction in particle size. In fact, as reported above increased mixing time and/or speed often leads to increased particle size in the Tritsch method.

15. These experiments demonstrate that the Tritsch method cannot produce particles having an average diameter of about 80 to about 120 nm, as currently claimed. In fact, the particles of the Tritsch method are at least two times (from 206% to 352%) as large as the claimed droplets. The decrease in particle size from the method of Tritsch reported herein to the claimed compositions is both statistically and commercially significant.

16. Based on my knowledge and experience, and in view of the results presented herein, it is my opinion that one of skill in the art would not have expected, using the disclosure of Tritsch, to produce compositions having particles of the claimed size.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: March 17, 2005

Chyi-Cheng Chen

Chyi-Cheng Chen